SILVER SPORT
Transmissions

CORVETTE
1984 – 1988

TKO 5-SPEED
MANUAL TO MANUAL

TRANSMISSION CONVERSION INSTALLATION MANUAL

FOLLOW FACTORY SERVICE MANUAL (FSM) RECOMMENDED SAFETY PRECAUTIONS. TRANSMISSION REMOVAL AND INSTALLATION IS A LABOR INTENSIVE JOB, WHICH CAN RESULT IN SERIOUS INJURY OR DEATH IF CAUTION IS NOT TAKEN. PLEASE BE CAREFUL PERFORMING THIS JOB, OR HAVE A PROFESSIONAL PERFORM THE JOB FOR YOU. REFER TO FACTORY SERVICE MANUAL (FSM) FOR ADDITIONAL DETAILS OF THE PROCEDURES BELOW, AS REQUIRED.

FOR BOLT TORQUE SPECIFICATIONS, REFER TO YOUR FACTORY SERVICE MANUAL.

The material herein is the intellectual property of Silver Sport Transmissions ("SST") and is to be used by SST customers or their authorized installers for the sole purpose of installing SST-supplied transmissions and related parts. Under no circumstances shall the manual or any portion thereof be copied, duplicated, distributed or incorporated in any written or printed document without the express written approval of Silver Sport Transmissions.

Before you start:

Test drive the vehicle, if possible, before you begin. Pay attention to noise and vibration and record your observations. At the end of the installation, perform another test drive to compare.

In addition to this manual, you should have received instructions for checking your bellhousing runout. **The bellhousing runout must be checked (and corrected if necessary) for Tremec's warranty coverage.**

You should also verify the parts you received. Compare the received items to the detailed invoice provided in your shipment.

PLEASE READ ALL INSTRUCTIONS BEFORE INSTALLATION

In addition to these instructions, you should receive the following instructions based on your order, **if applicable**:

1. All kits –MAA-00101 Inspection and Correction of Bellhousing to Crankshaft Runout
2. Hydraulic throw out bearing kit – MAG-00402 Hydraulic Kit Instructions for GM
3. MAA-00201 – Automatic to Manual conversion, General Guidelines

Your invoice lists the individual hardware packs and where they are used.

NOTE: Transmission **must** be test shifted before installation. Due to jostling during shipping, some transmissions will not shift properly when removed from the box. Please make sure that the gear selector will move into each of the six possible positions while rotating the input shaft and checking for output shaft rotation. The rubber sleeve may need to be removed from the output shaft to allow it to turn easier (see photo on page 6). If the input shaft will not turn, slide the clutch disc over the input shaft and jerk the clutch disc left and right to break it free. If this does not correct the issue, call Silver Sport Transmissions at **865-609-8187 extension 118** for instructions.

THIS CANNOT BE CORRECTED WITH THE TRANSMISSION INSTALLED IN THE CAR! TEST SHIFT FIRST!

REMOVE EXISTING EQUIPMENT

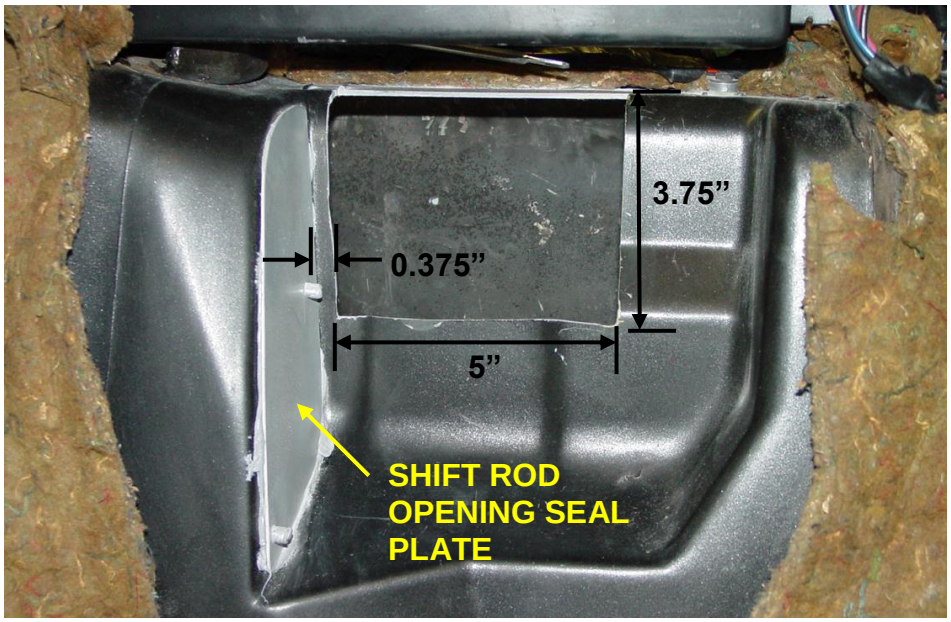
1. Disconnect negative (-) battery cable.
2. Remove the rear portion of the top engine cover and loosen the distributor cap, laying it to one side. Do not disconnect the spark plug wires. Disconnect flexible breather tube at plenum.
3. Remove LH & RH interior side panels from console.
4. Remove shift lever knob by using a screw driver to gently pry up the OD button, front and back, to release it from the clips. Unscrew the “T” rod and pry out the wedge lock, then unscrew the shift knob. If difficulties are encountered, consult a service manual for additional details.
5. Remove the reverse lockout mechanism from the shift lever.
6. Remove the glove box top and set aside. Remove the console top screws along with the two screws in the bottom of the radio fascia and remove the console top cover with the boot. In addition, it may be necessary to unscrew and remove the cigarette lighter housing to allow the console to be removed. If difficulties are encountered, consult a service manual for additional details.
7. Remove driver’s seat and driver’s seat base from vehicle.
8. Remove safety belt anchor bolt from the console, remove kick plate at accelerator pedal, remove screws holding LH interior side panel and remove the side panel from vehicle.
9. Raise car securely on lift or jack stands. 6 ton jack stands will allow you to raise the car higher than 3 ton jack stands will, which makes the installation easier.
10. Remove shift rods from transmission.
11. The cable that attaches to the shift mechanism is the ignition key lock and needs to be removed from the shift mechanism and the retaining clip. To permit ignition key operation and removal after the conversion, the cable needs to be pushed in all the way in to the released position and then restrained to prevent movement. Tuck away and verify that ignition key can be operated and removed.
12. Remove the shift rods from the shift mechanism in the vehicle console pocket, disconnect the OD wire on the shift lever and remove the shift mechanism and rods from the vehicle along with the shift mechanism brace. Tape bare wire.
13. Remove the rubber shift rod weather boot from under the car by using a 3/8” drill to remove the rivet heads.
14. If equipped, remove the underbody X bracing.
15. Disconnect the O2 sensor lead and remove the complete exhaust system from the vehicle. Remove the transmission mounted exhaust hanger bracket/shield and two 8mm bolts which attach the bracket to the transmission. These parts will be reused and need to saved.
16. Identify, tag and remove the electrical connections at the transmission. Only the reverse light wires and the speed sensor wires will be reused. The remaining wires can be disconnected or tied back out of the way.
17. Disconnect the fluid lines from the transmission. The lines can be removed all the way to the radiator. Fluid will drain.
18. Secure and support the rear of the engine with a hydraulic jack.
19. Secure and support transmission (jack recommended) to take pressure off the torque arm and to support the transmission when the torque arm is removed.
20. Loosen the torque arm bolts at the differential, remove torque arm bolts/nuts at the transmission and move the torque arm to the side. The torque arm and bolts/nuts will be reused. The transmission must be removed before the torque arm can be completely removed.
21. Remove the driveshaft from the differential and remove from the vehicle. The driveshaft will be reused, but with a new slip yoke and front U-joint provided by SST in the transmission kit.
22. Unbolt the transmission, move to the rear of the vehicle to disengage the transmission from the clutch unit and remove from the vehicle. Complete removal of the torque arm.
23. Unbolt the starter and tie out of the way. Keep any shims with the starter for reuse.

24. Remove the hydraulic clutch slave unit from the bellhousing and tie up out of the way. Do not break hydraulic lines to avoid having to bleed the system.
25. Remove the bell housing dust cover, bellhousing and clutch unit.
26. Remove clutch fork and release bearing from bellhousing. Inspect release bearing, fork, and pivot ball stud for wear. Contact Silver Sport Transmissions for replacement parts if needed.
27. Inspect flywheel ring gear teeth (no cracks, chips, wear), and friction surface (no cracks, grooves, or hot spots). Silver Sport Transmissions strongly suggests removing flywheel and having it resurfaced, then dynamically balanced at a reputable automotive machine shop **unless** the engine was externally balanced with the flywheel installed.
28. Remove pilot bushing using removal tool (not supplied).

A. PREPARE CAR FOR NEW TRANSMISSION

The SST 5 speed will require that you modify the existing transmission tunnel. You will be covering up the existing hole that the shift rods go through, and you will be creating a new opening for the 5 speed shift linkage to come through.

1. Cut an opening in the original shift pocket for clearance for the new horizontal shift lever and shift tower. Refer to photo below for reference for the cut out. The opening in the side of the pocket starts 0.375” back from the vertical front wall and is 5” wide. The bottom edge of the opening is 3.75” down from the top surface of the tunnel. The new opening continues across the top surface of the tunnel, extending 1” across the top surface towards the right side of the tunnel, forming a 1” by 5” opening along the top edge of the tunnel. To complete the work in the pocket, drill two 1/4” diameter holes in the two lowest points of the pocket wall for drainage.
2. Install the shift rod opening seal plate, the smaller of the two pieces of sheet metal provided, to cover the opening left in the shifter pocket after removal of the original shift rods. The seal plate should be painted and installed from inside the car on the inside of the shifter pocket using 3/16” diameter pop rivets with backup washers (not supplied) through the original shift boot screw holes. Bed the plate in a generous layer of waterproof sealer (not supplied) prior to fastening in place.

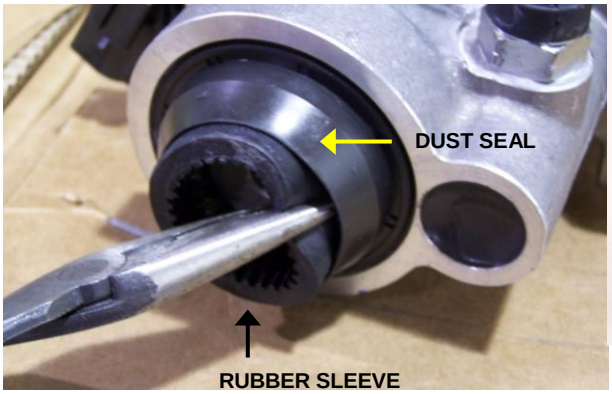


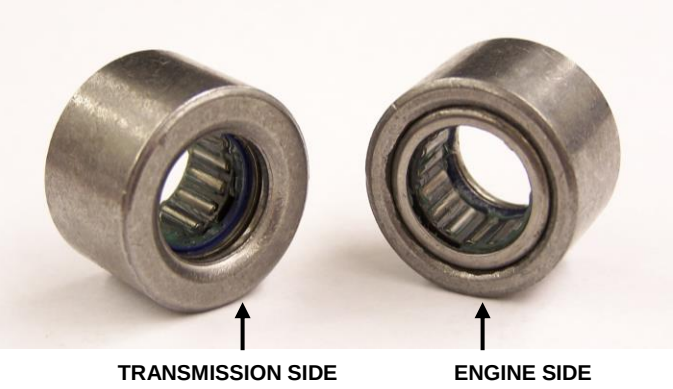
3. The larger piece of sheet metal supplied is used to form a new driver's side wall over the original shift pocket. Begin by sliding the flat sheet metal on to the top of the tunnel, noting that the notch in the sheet metal should fit around one molded tunnel bolt boss. With the opening in the metal and the metal squared to the new tunnel opening, note where the bend radius needs to be to fit the contour of the tunnel. Remove the metal and begin to bend the sheet metal to fit over the tunnel radius. Continue trial fitting and bending until the metal fits well. The lower portion of the sheet metal will also need to be formed to follow the contour of the lower portion of the tunnel below and around the pocket. Trial fit and bend until satisfactory. See photo. Paint for corrosion protection and set to one side for permanent installation later.

B. TRANSMISSION INSTALLATION

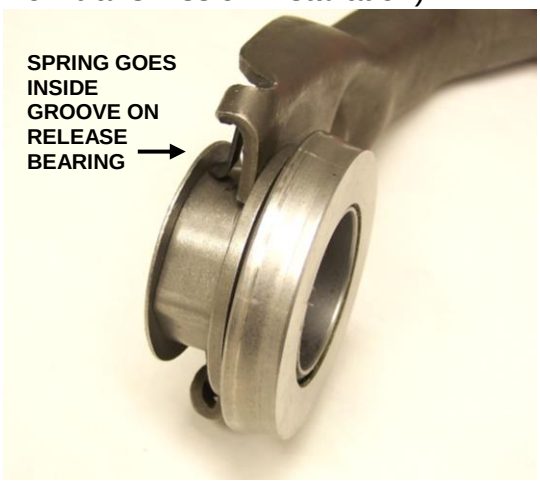
1. Set transmission to reverse gear (remember to test shift the transmission per packing instructions).
2. Remove the two small socket head bolts from the horizontal shift link and separate the link from the clamp.
3. To ease transmission installation, remove the billet shift tower assembly from the shift tower mount plate by removing the two socket head bolts holding it to the shift plate. Note or mark orientation of tower for reassembly. Remove the shift tower mount plate by removing the 6 fasteners bolting it to the transmission. Retain these parts for reinstallation later. The horizontal shift link remains on the transmission but care needs to be exercised during installation to prevent interference of the link with the tunnel wall.
4. Confirm existence of rubber sleeve on output shaft (see photo on page 6). Reinstalling the rubber sleeve that was removed during test shifting will help prevent fluid leakage during the installation. Fill transmission with 2 quarts, 20 ounces of transmission fluid**. GM Synchromesh (part # 88900333; formerly part # 12345349) or Pennzoil (part #3501) is the recommended fluid and will provide the best shift quality. DEXRON/MERCON ATF (non-synthetic) and Mobil 1 ATF are the ONLY other fluids approved by Tremec. <u>The use of ANY other fluid will void your warranty.</u>** Silver Sport Transmissions recommends that the fluid be replaced after the first 500-1000 miles of normal driving, and then every 30,000 miles thereafter. It is acceptable to use the less-expensive DEXRON/MERCON fluid for the break-in period and then replace it with GM Synchromesh.

5. Install new pilot bearing assembly using a bearing driver or a socket of similar diameter to the bearing and a mallet. Make sure the bearing is installed facing the right direction (see photo below). Gently tap bearing fully into crankshaft until bearing face is flush with crankshaft face. **NOTE:** The pilot bearing is designed to be a slight press fit in the bore, and the pilot bearing hole is not always sized correctly in some crankshafts. Your pilot bearing OD should be between one-half of a thousandth and two thousandths of an inch (0.0005" - 0.002") larger than the ID of the hole in your crankshaft. If outside of this range, a different pilot bearing is required, or your crankshaft or pilot bearing may be modified to fit. Contact your local parts store or machine shop for a suitable replacement or to modify your existing parts.





6. Install bellhousing and inspect for proper alignment to crankshaft using dial indicator or test indicator (SST can provide these tools at extra cost). See "Inspection and Correction of Bellhousing To Crankshaft Runout" provided with your literature package. Make sure to record your runout data in a safe place, as it will be required in the event of a warranty issue. Mark offset dowel pin position (if used), and carefully remove bellhousing.
7. Using clutch alignment tool, attach clutch disc and pressure plate to flywheel. Install each bolt only finger tight on the first round, then incrementally tighten each one in an alternating sequence until all six are snug. Torque each one in the same sequence to 35 lb.-ft.
8. Lower rear of engine as far as possible (required for new transmission installation).
9. With the bellhousing still removed from the engine, install clutch fork and release bearing in the bellhousing. *The tips of the clutch fork and the spring fingers on the rear side of the clutch fork* ***both*** *fit* ***inside*** *the groove on the release bearing.*



10. Install bellhousing to engine, while making sure that there are no hoses, cables, or wires caught between the bellhousing and engine block. Torque the fasteners to the specification found in your factory service manual.
11. Reinstall slave cylinder, dust cover and starter with shims, if used.
12. Install transmission, using caution when inserting the input shaft into the clutch disc and pilot bearing. Monitor horizontal shift link for interference, as noted previously. The horizontal link will need to be raised and fed into the opening you created in the shifter pocket, as the transmission is raised during installation. Do not allow weight of transmission to rest on assembly until fully engaged (doing so can misalign disc or damage pilot bearing). Due to the tight clearance around the upper right transmission to bellhousing bolt, a socket head bolt can be substituted for the hex head bolt if you do not have a suitable hex head wrench. The rubber output shaft sleeve may be temporarily removed and the slip yoke inserted and the output shaft

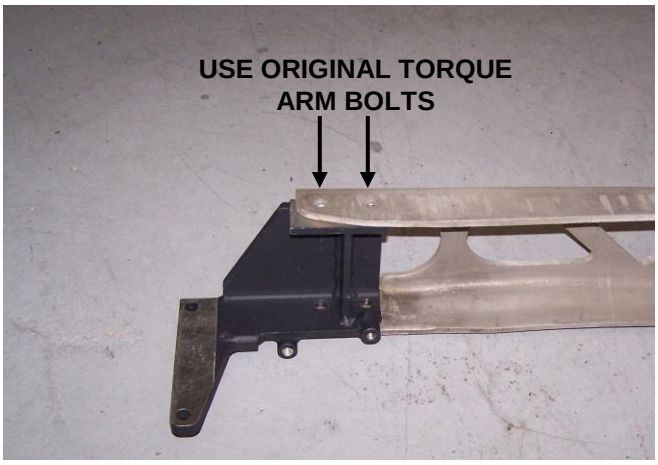
rotated, as required, to facilitate engagement into clutch disc. **DO NOT** draw the transmission up to the bellhousing by tightening the transmission-to-bellhousing bolts before the transmission is fully seated into the bellhousing!

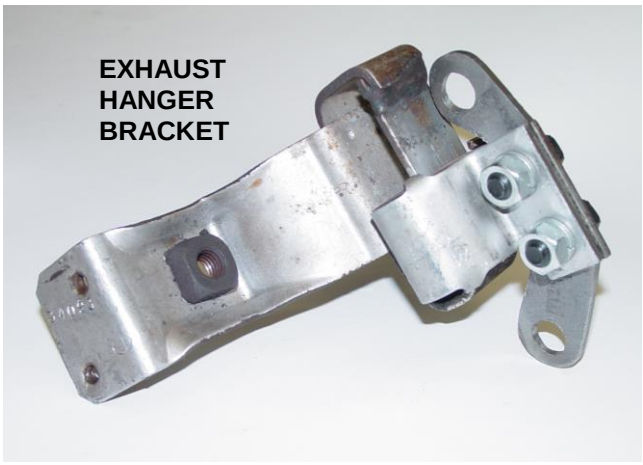
> **NOTE:** If the transmission stops approximately ½ inch away from seating fully against the bellhousing, install and **finger-tighten** bellhousing to transmission bolts. Connect clutch linkage and depress pedal lightly while pushing transmission forward to facilitate alignment of clutch disk to input shaft and pilot bearing. **DO NOT** force the transmission into engagement – damage to the pilot bearing may result. Tighten bellhousing to engine bolts once the transmission is seated against the bellhousing.

13. Once the transmission is fully seated by hand against the bellhousing, fasten with ½" x 1 ¾" bolts and washers provided (HWG-PACK A) and torque to 50-60 lb.-ft.
14. Before raising transmission to final height, reinstall the shift tower mount plate with the six original fasteners. Once the shift tower mount plate is reinstalled, raise the engine/transmission to approximate original driveline angle. Note: The transmission must be continuously supported or it will drop without the torque arm installed to support it.
15. Reinstall the billet shift tower on the mounting plate, reusing the two socket head bolts.
16. From inside the car, position the ball with the nylon cup on the bottom of the shift stub into the horizontal shift link, and then reattach the clamp to the horizontal shift link using the two small socket head bolts removed earlier.
17. Place the previously fitted and painted sidewall sheet metal against the shift pocket inside the car and mark around the edge for a location reference.
18. While holding the sheet metal in place, begin drilling holes around the outside edge of the sheet metal from inside the car, through the sheet metal and the fiberglass. Gradually work around the sheet metal sides, bottom and top.
19. Remove the sheet metal and install a generous amount of sealer (not supplied) around the perimeter of the shift pocket, using the marked outline as a guide. Reinstall the sheet metal against the tunnel, pressing it into the sealer and begin fastening in place with 1/8" pop rivets and backup washers (not supplied).
20. The boot and chrome trim ring provided will be installed as a weather seal covering the opening in the sheet metal. The shift lever sits below the opening. Begin by centering the boot and trim ring over the center of the shift tower and shift lever. The right side of the trim ring and boot will slide under the carpet and insulation, which will hold that edge in place. Drill four holes and install the four screws to hold the rest of the trim ring and boot in place. The left edge of the trim ring can be rolled over the edge of the tunnel, as required.
21. Place the supplied torque arm bracket against the transmission to note the orientation (do not fasten at this time). Two ½"-13 bolts will go up through the bottom plate into the transmission mount pad. Two 7/16"-14 bolts will go horizontally from the driver's side through the two outer holes of the new exhaust hanger bracket, through the holes on the bottom side of the tailhousing and into the threaded bungs in the torque arm bracket. The original exhaust hanger bracket will attach to the two center holes in the new exhaust hanger bracket.
22. On a work bench or work area, loosely attach the new transmission torque arm bracket to the original torque arm with the original bolts, washers and nuts. See photo below. Install the torque arm on the differential without bolts and work the transmission bracket up next to transmission. Temporarily hold torque arm assembly in place.
23. Remove the slip yoke and U-joint from your original driveshaft, and install the new slip yoke and U-joint provided onto your original driveshaft. The rubber output shaft sleeve MUST be removed at this point (see step B-4 and photo on pg. 6). Install driveshaft by inserting the slip yoke into the rear of the transmission first. Then position the rear U-joint in the differential U-joint saddles. It will be helpful to be able to rotate the rear wheels. Install rear straps and

torque to factory specs. Make certain all parts are clean and properly assembled. Double check your assembly.

24. Install the rear differential torque arm fasteners but do not tighten.
25. Bolt the original exhaust hanger bracket to the new exhaust hanger mounting bracket using the two original 8mm bolts and new 8mm nuts and lockwashers. The new hanger mounting bracket mounts on the left (driver's) side of the original exhaust hanger.

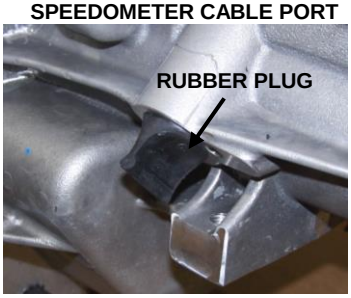




26. Install the four bolts (two vertical and two horizontal) which hold the torque arm bracket to the transmission. The exhaust hanger bracket is installed, as previously described, with the two horizontal 7/16" bolts that go through the transmission tailhousing and into the torque arm bracket. The transmission height may need to be adjusted slightly up or down to get all the bolts to line up and started in the threads. Once all bolts are started, finish bolting the bracket to the transmission.
27. Complete the torque arm installation by tightening the original factory fasteners on the transmission torque arm bracket and the differential. Once the torque arm is secured, the transmission jack and engine support jack can be removed.
28. Reinstall bellhousing inspection cover and starter.
29. The reverse light switch is located on the driver's side of the main case, and is a black-bodied switch with two studs (see photo on next page). The switch is a normally open, non-directional switch that will complete the lighting circuit when the transmission is in reverse. SST has provided a two-wire harness with your kit that will attach to the 5-speed backup light switch. It can be spliced into your car's wiring harness in place of your original switch that was connected to your shift linkage.
30. The TKO transmission has a mechanical speedometer cable port that will not be used for your Corvette. It is on the driver's side of the tailhousing, just above the transmission mount pad. Remove the black rubber plug from the speedometer cable port, and install the speedometer output plug and o-ring that came with your kit.
31. The wire pigtail at the very back of the tailhousing is a neutral safety switch (see photo on next page). It is a normally open, non-directional switch that will complete the circuit when the transmission is in neutral. The plastic connector may be removed and the neutral safety switch may be spliced in to your starter circuit between the ignition switch and the starter solenoid if you so choose.

REVERSE LIGHT SWITCH

SPEEDOMETER CABLE PORT



NEUTRAL SAFETY SWITCH

ELECTRONIC SPEED SENSOR

32. The electronic speed sensor is on the passenger's side of the tailhousing, just above and forward of the transmission mount pad. The sensor is a standard two wire GM, sine wave output, with 17 pulses per tailshaft revolution, which equates to roughly 33,000 to 60,000 pulses per mile depending on axle ratio and tire size. For reference, a 26" tire with a 3.07 gear will produce 40,507 pulses per mile.
33. Splice speed sensor pigtail socket assembly ELA-6625 into the original speed sensor wires, maintaining primary color orientation. The yellow wire on the ELA-6625 is the signal wire, and the black wire is ground. The remaining connectors from the original transmission will not be used and should be tied back out of the way.
34. Reinstall the exhaust system.
35. Reinstall the underbody X bracing (if equipped).
36. Bolt on shifter handle with 3/8"-24 x 1"bolts and washers (HWA-PACK L). Use medium strength threadlock compound. Torque to 25 lb-ft. Confirm shifter motion through all gears.
37. Reinstall the console and interior components removed to permit installation.
38. The Electronic Ratio Adapter (ERA) provided needs to be installed to permit the speedometer to read correctly. It will be connected in series in the Vehicle Speed Sensor (VSS) signal circuit. The vehicle harness wire that the electronic ratio adapter needs to be spliced into is accessed by removing the under dash fascia on the passenger side of the vehicle. It is also helpful to remove the metric hex head bolts from the strap holding the ECM in place and pull the ECM down to allow access to the wiring. The wires on the vehicle need to be tested with a meter and verified by consulting a FSM wiring diagram. Connect the red wire from the ERA to a 12 volt switched power source, and the black wire to a good chassis ground.
    - On 1984-86 cars, locate the black 8-terminal connector at the ECM that has a yellow wire going in one side and a brown wire with a white stripe coming out the other side at terminal D. Cut the brown and white wire coming from terminal D. Connect the end of that wire that comes from the 8-terminal connector to OUT 3 on the ERA. Connect the other end to the "INPUT" or "Sig. IN" on the ERA. Set the dip switches so that 1 and 2 are OFF, and 3 and 4 are ON.
    - On 1987-88 cars, locate the black 16-wire connector with a clear cap. Cut the yellow wire coming from terminal K. Connect the end coming from the VSS to the "INPUT" or "Sig. IN" terminal on the ERA, and connect the end going to terminal K to the "OUT 3" terminal. Set the dip switches so that 1, 2, and 4 are OFF and 3 is ON.
39. Adjust the ERA by using the UP and DN buttons on the unit. While driving, press the UP button to increase the speedometer reading, or DN to decrease the speedometer reading. You can put the ERA into "Coarse" adjustment mode to make large changes by holding the UP button down as the ignition key is turned on, or you can put it into "Fine" adjustment mode by holding the DN button down as the ignition key is turned on. Please see the instruction manual that comes with the ERA for more information.
40. Reinstall ECM, wire bundles, tuck ERA in a safe area under dash after calibration is completed and replace the under dash fascia.
41. Install ignition cluster cover/distributor cap (if equipped), and breather.
42. Reconnect negative (-) battery cable.

FINAL INSTALLATION STEPS

1. If you did not fill the transmission with fluid before installation, remove the fill plug on the passenger's side of the transmission and fill with 2 quarts, 20 ounces of transmission fluid, or until fluid runs out of the fill hole with the vehicle level. **GM Synchromesh (part # 88900333; formerly part #12345349) or Pennzoil (part #3501) is the recommended fluid and will provide the best shift quality. DEXRON/MERCON ATF (non-synthetic) and Mobil 1 ATF are the ONLY other fluids approved by Tremec. The use of ANY other fluid will void your warranty.** Silver Sport Transmission recommends that the fluid be replaced after the first 500-1000 miles of normal driving, and then every 30,000 miles thereafter. It is acceptable to use the less-expensive DEXRON/MERCON fluid for the break-in period and then replace it with GM Synchromesh. Reinstall the fill plug after adding fluid.
2. Start engine and allow engine to idle for a few minutes.
3. Check for leaks while warming up.
4. Slowly rev engine in neutral and listen for any unusual sounds or vibration.
5. Shift through all forward gears with the clutch disengaged (clutch pedal depressed).
6. Do not shift into reverse above idle speed or while moving forward, reverse is not synchronized. Shifting into reverse may require shifting into a forward gear first to prevent grinding.
7. Test drive at low speeds and low RPM.
8. Gradually increase engine RPM and vehicle speed.
9. Compare this test drive to the pre-installation test drive.
10. Drive conservatively for the first 500-1000 miles for transmission break-in.
11. If you experience vibration at highway speeds, check for body contact with the new transmission, and correct as necessary.

SPECIFICATIONS AND MAINTENANCE

GM Synchromesh (part #88900333; formerly part #12345349) or Pennzoil (part #3501) is the recommended fluid and will provide the best shift quality. DEXRON/MERCON ATF (non-synthetic) and Mobil 1 ATF are the ONLY other fluids approved by Tremec. The use of ANY other fluid will void your warranty. Silver Sport Transmissions recommends that the fluid be replaced after the first 500-1000 miles of normal driving, and then every 30,000 miles thereafter. It is acceptable to use the less-expensive DEXRON/MERCON fluid for the break-in period and then replace it with GM Synchromesh.

FLUID CAPACITY: 2 QUARTS, 20 OUNCES (U.S.)

DO NOT EXCEED MAXIMUM INPUT TORQUE:

- TKO 500: 500 lb.-ft. in 4th gear
- TKO 600: 600 lb.-ft. in 4th gear

GEAR RATIOS:

- TKO 500
  - 1ST 3.27
  - 2ND 1.98
  - 3RD 1.34
  - 4TH 1.00
  - 5TH 0.68
- TKO 600
  - 1ST 2.87
  - 2ND 1.89
  - 3RD 1.28
  - 4TH 1.00
  - 5TH 0.64 (0.82 OPTIONAL)

CONTACT INFORMATION

SILVER SPORT TRANSMISSIONS
2250 STOCK CREEK BOULEVARD
ROCKFORD, TENNESSEE 37853-3043
Phone: (865) 609-8187
Toll Free: (888) 609-0094
Fax: (865) 609-8287

SALES EXTENSION: 113

CUSTOMER SERVICE AND TECH SUPPORT
EXTENSION: 118

WWW.SHIFTSST.COM

SILVER SPORT TRANSMISSIONS IS DEDICATED TO YOUR SATISFACTION AND ENJOYMENT OF THIS PRODUCT. PLEASE SEND US PICTURES OF YOUR CAR ALONG WITH A TESTIMONIAL OF HOW YOU RATE THIS PRODUCT. WE WILL BE POSTING MANY CUSTOMER FEEDBACK LETTERS AND PICTURES ON OUR WEBSITE AND BROCHURES.

ENJOY YOUR SILVER SPORT TRANSMISSION SYSTEM!